PAMS Technical Documentation
NSW-4 Series Transceivers

Tuning Instructions

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AMENDMENT RECORD SHEET

Amendment Number	Date	Inserted By	Comments
	08/00	OJuntune	Issue 1

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CONTENTS

Page No

Tuning Instructions 4
General 4
Required Equipment 5
Equipment Setup 5
Central Service Concept for NSW-4 6
Point of Sale Flash Concept for NSW-4 7
Tuning with covers off using Module Jig JBS-25 8
Tuning Steps 9
1. AFC Tuning 9
2. VCTCXO Tuning 9
3. I/Q Modulator Amplitude Balance and Phase Shift Tuning 10
4. Tuning of Transmitter Power Levels 10
800MHz Analog TX output power 11
800MHz Digital TX output power 11
TDMA1900 TX output power 12
5. RSSI Digital Receiver (AGC) 12
6. RSSI Analog Receiver 13
7. RX Audio 13
8. TX Audio 13
9. TX Audio 13
NAM programming instructions 14
Menu driven easy NAM programming 14
Complete NAM Programming Instructions 15
Access NAM Programming Mode: 15
MAIN MENU Selection 15
Programming NAMs 1 through 3 15
Programming the Security Code: 16
Programming Emergency numbers: 16
Serial Number (ESN): 16
Programmed: (Date the phone is first programmed) . . 16
Exiting NAM Programming: 16
Field test: 17
Programming PSIDS and RSIDS: 17
Warranty transfer 19
Warranty Transfer service concept 19

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Tuning Instructions

General

All tuning operations of the NSW-4 are carried out using the service software. The service software turns the phone into the locals mode, in which the phone can be outwardly controlled via the MBUS interface.

Tuning is based on the software communicating with the D/A and A/D converters of the phone. In some instances the phone processor will also calculate the required correction parameter.

The tuning values of the phone reside on the EEPROM. The contents of the EEPROM can be read by the service software and saved as a file. This is advisable when there is need to retain that information, e.g. in view of replacement of the circuit. The program also enables writing the default parameters on the EEPROM, in which case all tuning steps should be carried out.

During tuning, proceed as follows:

- Take care not to damage sensitive measuring instruments with excessive RF power.
- Carry out all tuning steps in the shortest possible time to avoid excessive heating of RF units.
- Perform all tuning steps in the order presented.
- Never try to mask a fault by tuning it out!

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Required Equipment

- PC/AT computer with service software; see separate section for instructions on installation and use.
- Service accessories; see equipment setup pictures.
- Multimeter or DVM.
- Measuring equipment as follows:
    - RF generator
    - pulse power meter
    - spectrum analyzer
    - attenuator and branching unit

Equipment Setup

Caution: Make sure that you have switched off the PC and the printer before making connections !

Caution: Do not connect the PKD–1 key to the serial port. You may damage your PKD–1 !

Attach the protection key PKD–1 to parallel port one (25–pin female D–connector) of the PC. When connecting the PKD–1 to the parallel port be sure that you insert the PC end of the PKD–1 to the PC (male side). If you use a printer on parallel port one, place the PKD–1 between the PC and your printer cable.

Next connect the M2BUS service cable, DAU–9S, to the serial port (RS–232) of the computer. Attach one end of the service cable to the PC serial port and the other end to the Flash Adapter FLA-12.

When the phone covers are removed the jig JBS-25 must be used.

For audio measurements the audio box JBA-6 is used.

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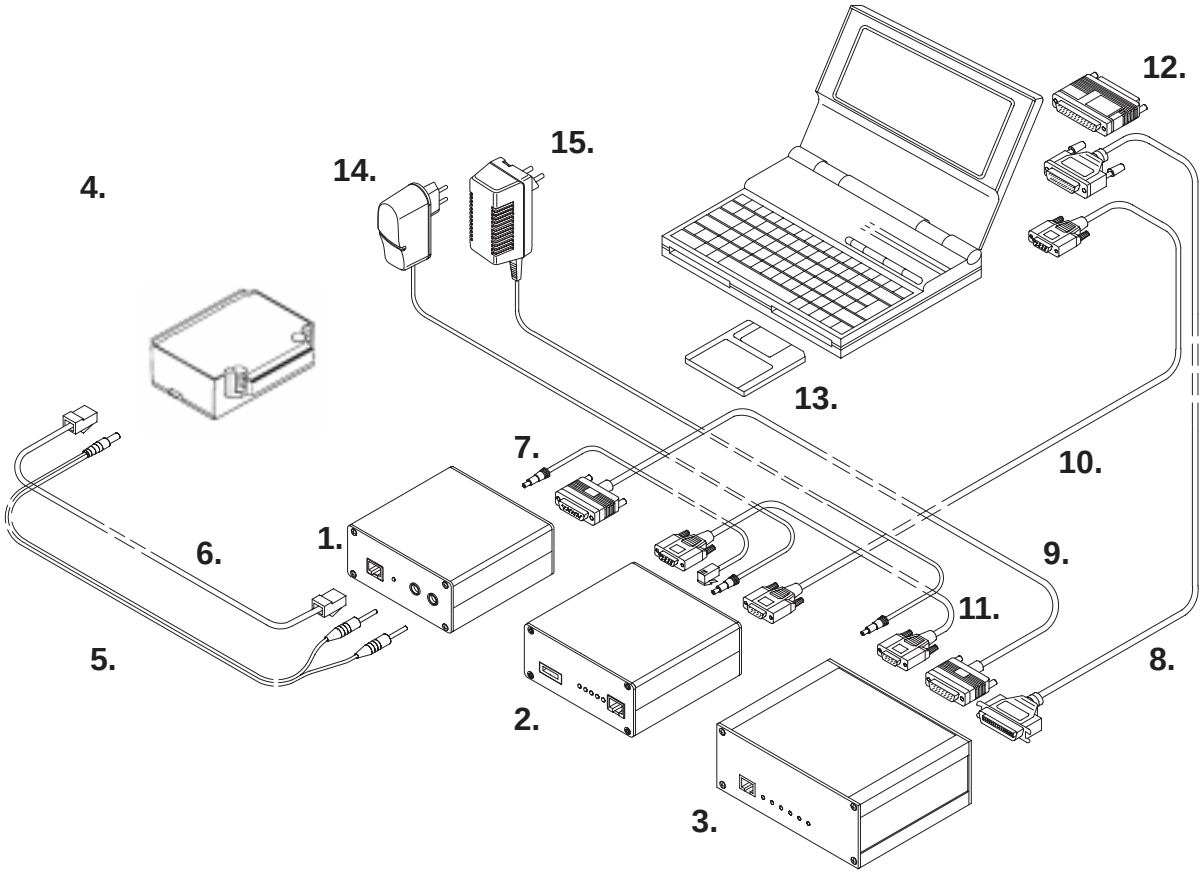
Central Service Concept for NSW-4



Item:	Service accessory:	Type	Product code:
1	Flash Loading Adapter	FLA–7	0070119
2	Flash Security Box	TDF–4	0770106
3	Flash Prommer	FPS–4S	0081275
4	Service and Flash Adapter	FLA–12	0080389
5	DC Cable	PCS–1	0730012
6	Service Cable	SCH–5A	0730166
7	DC Cable	PCC–1	0730053
8	Printer Cable (Included in FPS–4 sales pack)		0730029
9	D15 – D15 Cable	AXS–5	0730091
10	D9 – D9 Cable (Included in FPS–4 sales pack)	AXS–4	0730090
11	D9 – D9 Cable	AXS–4	0730090
12	Software protection key	PKD–1	0750018
13	Service SW diskette 3.5” for NSW-4 DLL		0774099
	Service SW diskette 3.5” for WinTesla		0774046
	Product SW diskette 3.5” for UI Software		0775251
14	Travel Charger (USA/Japan)	ACH–6U	0675085
15	AC Charger	ACS–6U	0680018

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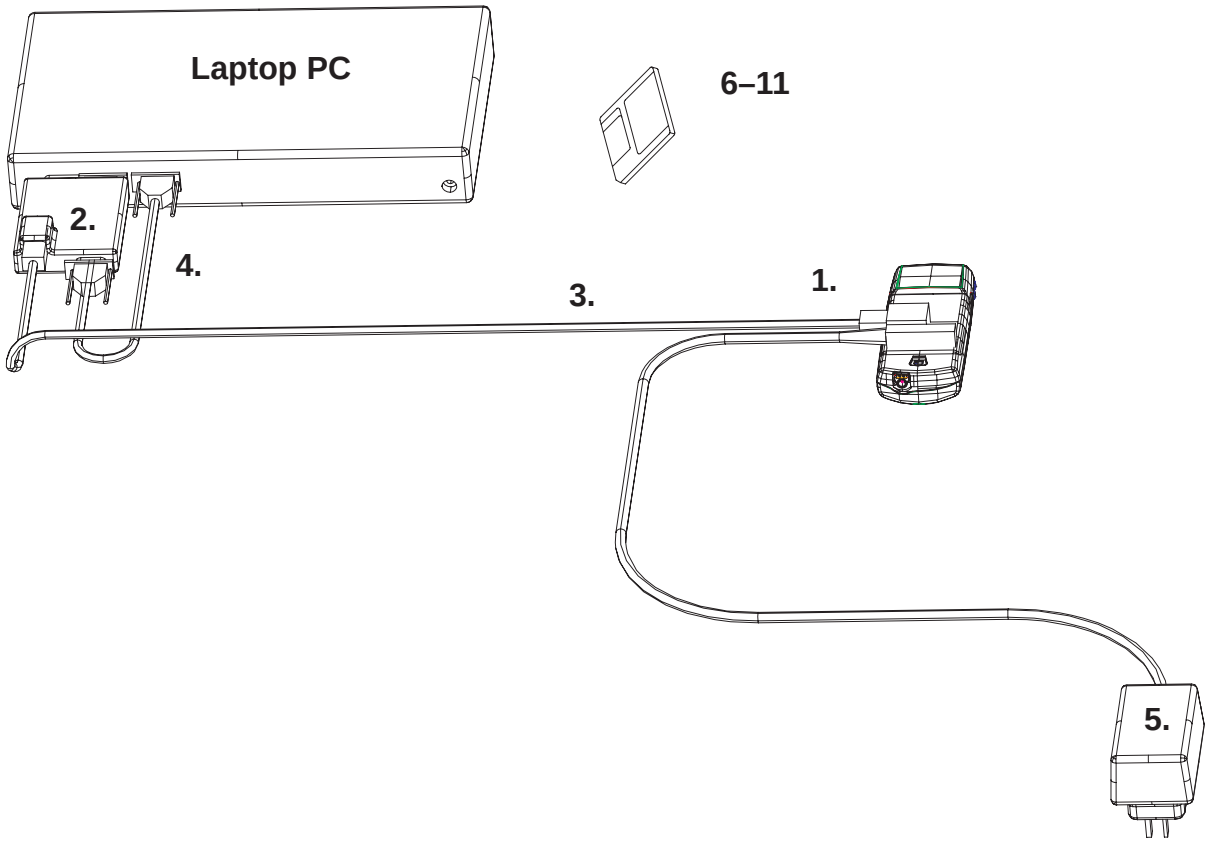
Point of Sale Flash Concept for NSW-4

With this equipment setup the user can flash a new software in the phone.



Item:	Service accessory:	Type	Product code:
1	Flash and Service Adapter	FLA-12	0080389
2	POS Flash Adapter	FLS-2D	0081309*
3	Modular Cable	SCH–5A	0730166*
4	D9–D9 Cable	AXS–4U	0730163*
5	Performance Travel Charger	ACP–8U	0675196
6	Product SW diskette 3.5” (UI Software)		0775251
7	Service SW diskette 3.5 (Wintesla)		0774046
8	Service SW diskette 3.5” (NSW–4 .DLL)		0774099
9	Service SW diskette 3.5” Dongle Drivers for 16bit (Windows 3.1x)		0770177*
	Service SW diskette 3.5”, Dongle Drivers for 32bit (Windows 95/98/NT)		0770176*
10	Service SW diskette 3.5”, FLE–5 Drivers		0774120*
11	Service SW diskette 3.5”, FLS–2D RemoteUpdate		0774123*
	FLS-2D Sales Pack, Installation and User Guide		0275405*
	FLS-2D Registration Request Form		0275404*
*	These items are included in the FLS–2D Sales Pack not shown		

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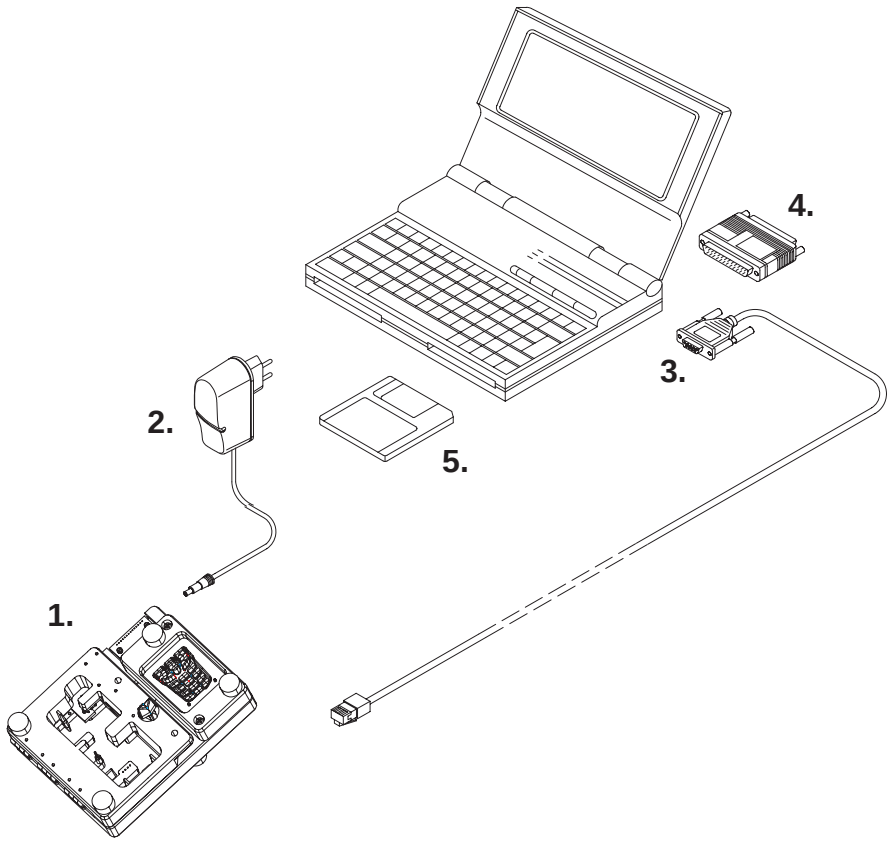
Tuning with covers off using Module Jig JBS-25



Item:	Service accessory:	Type	Product code:
1	Module Jig	JBS–25	0770185
2	Travel Charger	ACP–8U	0675196
3	Service MBUS Cable	DAU–9S	0730108
4	Software Protection Key	PKD–1	0750018
5	Service SW diskette 3.5” for NSW-4		0774099

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Tuning Steps

Note About Supply voltage.

The Service battery (Flash adapter) FLA–12 used for NSW-4 differs from the standard DCT3–Service battery. The max. supply voltage is 16 V.

1. AFC Tuning

This tuning adjusts the frequency of the reference oscillator so that the frequency criteria of the network will be met.

This adjustment loads the analog center frequency offset DAC value into the EEPROM. When doing this, a spectrum analyzer must be used.

Note: *Do not leave a tuning session on.* The analog transmitting takes maximum current. A prolonged tuning session may damage the phone or service battery. The service battery will be heated.

The spectrum analyzer settings are shown in the AFC tuning window.

– – Set the power supply voltage. See instructions above.

– – Connect the spectrum analyzer to the antenna adapter or to the diagnostic jig.

– – Check that the spectrum analyzer center frequency is correct.

– – Tune the center frequency 832.500 MHz +/– 200 Hz.

– – Once the center frequency is correct, press OK button.

2. VCTCXO Tuning

This tuning is to check that the radio unit has correct adjustment to meet the network criteria for frequency stability.

This adjustment loads the VCTCXO offset DAC value into the EEPROM. RF signal generator must be used in tuning.

– –Set the power supply voltage. See instructions above.

– –Connect the RF signal generator to the antenna adapter or to the diagnostic jig JBS–25.

– –Once the RF signal generator frequency is correct, press Meas button.

– –Set the correct RF level to the signal generator.

– –Remember to note the attenuation at RF signal level !

– –Once the frequency and RF level are correct, press OK button.

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3. I/Q Modulator Amplitude Balance and Phase Shift Tuning

This tuning is to adjust the DC–offset and phase offset of the I and Q–modulators so that the system requirements for modulation accuracy will be met.

- –Select Tuning —> TX I / Q
- –Connect the spectrum analyzer to the antenna adapter or diagnostic jig.
- –Use the following settings for spectrum analyzer in tuning:
    - Set spectrum analyzer center frequency to 830.700 MHz.
    - Set span 80 kHz
    - Set Ref LVL 20 dB
    - Set RBW and VBW 1 kHz
    - Set sweep time 0.3 s
- –Use ”TX I DC Offset” and ”TXQDC Offset” option to adjust CFR – 7.1 kHz to minimum.
- The amplitude difference between CFR and CFR – 7.1 kHz must be > 40 dB.
- –Use ”Phase Offset ” option to adjust CFR – 14.2 kHz to minimum
- The amplitude difference between CFR and CFR – 14.2 kHz must be > 40 dB.
- –Once the TX I, TX Q and phase shift are aligned, press SAVE button.

4. Tuning of Transmitter Power Levels

- This tuning is to adjust the output power level values of the radio unit according to the system specification.
- This adjustment loads the power levels of the phone transmitter into the EEPROM. When doing this, a pulse power meter or spectrum analyzer must be used.
- Tuning targets are listed next page.
- –Set power supply voltage. See Note above.
- –Connect the pulse power meter or spectrum analyzer. Use attenuator, if needed.
- – Settings for spectrum analyzer in power level tuning:
    - Set span 0 Hz
    - Set Ref LVL 30 dB
    - Set Ref LVL offset and —> Attenuation to Antenna Pad
    - Set RBW and VBW 300 kHz
    - Set sweep time 50 ms
    - Set TRIG: SWEEP CONT, VIDEO –10 dBm
    - Set marker at middle of slot.
    - Check that spectrum analyzer frequency is correct

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- –Settings for pulse power meter:
    - Do calibration if needed.
    - Set correct frequency
    - Set Ref LVL offset —> Attenuation to Antenna Pad
    - Set correct duty cycle, 33,3 % in digital mode and 100 % at analog mode.
- –Select Tuning –> Using WinTesla Select Tuning –> TX power –> LowBand/HighBand –>EEPROM values
- –All four tuning channels have to be tuned. Repeat tuning for A, B, C and D tuning channel. Tuning channel change reads old tuning values from phone's EEPROM.
- –Adjust power level by clicking the + and – buttons, power level change is done by keyboard keys ↑ and ↓ .
- –Tune the power levels, which are shown by "# for calculate"
- –Press Calculate button to calculate other power levels.
- –Check tuning, Do fine tuning if needed.
- –Once all TX tuning channels are correct, press SAVE button.
- –Tuning is done, if both Analog mode and 800 MHz and 1900 MHz digital mode are tuned.

There are different results when measuring TX power from the Test Pad of panel or the Antenna Pad, It must be ensured that the measurements from the Antenna Pad give correct results.

800MHz Analog TX output power

Power Level	RF Power at Antenna Pad	Tuning Target Tolerance	Testing Limits
2	22.0 dBm	+/–0.1 dB	**+0.5…– 0.5 dB** **22.5 – 21.5 dBm**

800MHz Digital TX output power

Power Level	RF Power at ext. Antenna Pad	Tuning Target Tolerance	Testing Limits
2	26.8 dBm	+/–0.1 dB	**+0.5…– 1.0 dB** **27.3 – 25.8 dBm**
3	23.5 dBm	+/–1 dB	**+/– 2.0 dB**
4	20.0 dBm	+/–1 dB	**+/– 2.0 dB**
5	16.0 dBm	+/–1 dB	**+/– 2.0 dB**
6	12.0 dBm	+/–1 dB	**+/– 2.0 dB**

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Power Level	RF Power at ext. Antenna Pad	Tuning Target Tolerance	Testing Limits
7	8.0 dBm	+/–1 dB	**+/– 2.0 dB**
8	4.0 dBm	+/–1 dB	**+/– 2.0 dB**
9	0.0 dBm	+/–1 dB	**+/– 2.0 dB**
10	–4.0 dBm	+/–1 dB	**+/– 2.0 dB**

Check that power level PL2 TXC DAC value is in the allowed range +50...300.

TDMA1900 TX output power

Power Level	RF Power at ext. Antenna Pad	Tuning Target Tolerance	Testing Limits
2	25.9 dBm	+/–0.1 dB	**+0.5…– 1.0 dB 26.4 – 24.9 dBm**
3	23.0 dBm	+/–1 dB	**+/– 2.0 dB**
4	20.0 dBm	+/–1 dB	**+/– 2.0 dB**
5	16.0 dBm	+/–1 dB	**+/– 2.0 dB**
6	12.0 dBm	+/–1 dB	**+/– 2.0 dB**
7	8.0 dBm	+/–1 dB	**+/– 2.0 dB**
8	4.0 dBm	+/–1 dB	**+/– 2.0 dB**
9	–0.0 dBm	+/–1 dB	**+/– 2.0 dB**
10	–4.0 dBm	+/–1 dB	**+/– 2.0 dB**

Check that power level PL2 TXC DAC value is in the allowed range +0...+250.

5. RSSI Digital Receiver (AGC)

This tuning is to measure the small signal gain of the radio unit to meet the system requirements for RSSI reporting.

- –Select tuning —>RSSI Digital (AGC) —> Low Band / High Band.
- –Set the power supply voltage. See instructions above.
- –Connect the RF signal generator to the antenna adapter or service jig.
- –Press Meas —> Dialog window shows the correct frequency and signal level.
    - Levels for Low Band are –95, –85, –75, –65 and –55 dBm and
    - Levels for Upper Band are –95, –85, –75, –65 and –55 dBm
- –Note, Cable loss.

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– –Repeat measurement with all signal levels.

– – Once tuning is correct, press OK button.

6. RSSI Analog Receiver

This measurement is for RSSI in analog mode, 800 MHz range.

– –Select Tuning —> RSSI Analog.

– –Set power supply voltage. See instructions above.

– –Connect the RF signal generator to antenna adapter or service jig.

– –Press Meas —> Dialog window shows the correct frequency and signal level.

– –Note, Cable loss.

– –Repeat the measurement with all signal levels.

– –Once tuning is correct, press OK button.

7. RX Audio

This measurement is for Audio output calibration of DAMPS mode. When doing this a signal generator must be used.

– –Select tuning —> RX Audio.

– –Connect the XMIC line to signal generator.

– –Tune the signal to the correct level.

– –Once the tuning is correct, press OK button.

8. TX Audio

This measurement is for Audio output calibration for DAMPS mode. When doing this the signal generator must be used.

– –Select tuning —> RX Audio.

– –Connect the XMIC line to signal generator.

– –Tune the signal to the correct level.

– –Once tuning is correct, press OK button.

9. TX Audio

– –Connect the phone to the service box JBU–8 and the DC cable (SCB–3) between the phone and service box.

– –Set the supply voltage to 10 V

– –Select Tuning —> Charging

– –Run calibrations by pressing <Meas> button.

– –Set supply voltage back to 8 V.

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Nokia 8260 cellular telephone NAM programming instructions

All Nokia 8260 cellular telephones are capable of supporting both Random and Default authentication methods. This programming guide describes the programming of generic 8260 handsets. The programmer must decide which A–Key type is desired for use.

There are two methods to program the NAM described below.

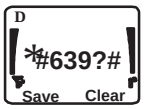
If a RANDOM A–Key is desired for use, use the Easy NAM 1 programming sequence.

If a DEFAULT A–Key is required, then use the Easy NAM 2 sequence.

Use the appropriate NAM if the Long NAM programming method is used. Use the CLEAR key to erase any mistakes.

Menu driven easy NAM programming

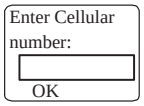
1. Turn on the phone and enter the Programming Access Code



*#6391# For NAM1 with a Random A–Key Value

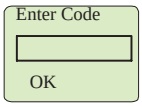
*#6392# For NAM2 with a Default A–Key Value

*#6393# For NAM3 with a Default A–Key Value



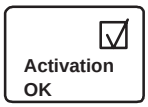
2. Enter the 10 digit Area Code and Phone Number

Press the TALK key (or the ”OK” softkey in the display)



3. Enter the System ID Code (SID) supplied by the cellular service provider (1 –5 digit SID) and press the TALK key (or ”OK” softkey in the display)

- Optional settings are Language and Lock Code (see below)



4. Short NAM Programming is completed
- The phone automatically powers off and then back on

NOTE:

Change the Lock code by adding a pound sign (£) and the new lock code after the SID. (Example: 175£7788; Lock code = 7788).

Change the Language by adding a pound sign and new language code after the code (Example: 175£0; Language = English).

Language Code: 0 (default) = English, 1 = French, 2 = Spanish, 3 = Portuguese.

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Change the Lock Code and Language code by separating each set of numbers by a pound sign (Example: 175£7788£2; Where the SID = 00175, Lock code = 7788, Language = Spanish).

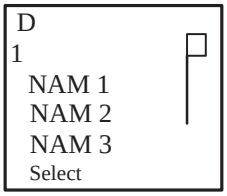
Complete NAM Programming Instructions

Access NAM Programming Mode:

1. Turn the phone on.

2. Enter the NAM access code.
Factory default is: *** 3 0 0 1 # 1 2 3 4 5** #

3. If the screen to the left appears, the access code was entered correctly.



If after several attempts you can not access NAM programming, it is possible that the NAM 2 access code has been changed, or the phone is in need of service.

MAIN MENU Selection

4. Press the [Scroll–Key] up or down until the indicator highlights the desired menu option. Select from the following:

NAM 1	NAM 2	NAM 3	Security	Emergency
SW version	Serial No.	Programmed	Field Test	

5.Press the [Select] softkey to access the Sub–Menu from and of the above Main Menu selections.

Programming NAMs 1 through 3

6. If the value is incorrect, press the [Select] softkey and use the keypad to enter new information.

Home system ID	Home SOC (when unlocked)	Own number	Alpha tag	PSID/RSID lists	Change defaults

Change Defaults (sub–menu from above)			
NAM Status (Enable/Disable)	Access method	Local option	Primary paging channel
Secondary paging ch	Dedicated A cch	Dedicated A cch number	Dedicated B cch
Dedicated B cch number	Overload class	Group ID	SID alpha tag control
A–key code	Public systems	Private systems	Residential systems

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7. Use the [OK] softkey to store the new information that has been entered.

8. Repeat steps 6 and 7 for the remaining NAM parameter options to be viewed and/or changed.

Programming the Security Code:

9. From the Main Menu, use the scroll keys to select the “Security” Sub–Menu, press [Select] and the current 5–digit security code will appear in the display. Default is 12345

10. If you wish to change the Security Code at this time, use the numeric keys to enter the new value.

11. Press the softkey [OK] to store changes.

Programming Emergency numbers:

12. From the Main Menu use the scroll key to select the ”Emergency” Sub–Menu, press the [Select] softkey to access the emergency numbers.

Emergency number 1 (911)
Emergency number 2 (*911)
Emergency number 3 (None)

13. If you wish to change the displayed value, use the scroll key to select the emergency number you wish to change and press [Select]. Then use the numeric keys to enter the new values

14. To save the value, press the softkey [OK].

15. Press [Back] to exit the menu.

Serial Number (ESN):

17. From the Main Menu, use the scroll key to display the “Serial No.” or ESN of the phone.

18. Press [Back] to exit the menu.

Programmed: (Date the phone is first programmed)

19. From the Main Menu, use the key to display the “Programmed” menu.

20. Press [Select] and enter a four digit number that corresponds to the month and year the phone is sold. Example (mmyy)

0199 = January 1999, 0401 = April 2001.

NOTE: This menu location can be programmed only one time. Once the date has been entered it can not be changed. Any attempt to enter the menu once it has been programmed will receive a short beep and the message “Date already saved”.

Exiting NAM Programming:

21. To exit the NAM programming mode, turn the phone off and leave it off for five seconds.

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Field test:

The Field Test Display Mode is used to investigate how the phone and the cellular network are interfacing together.

The Field Test Display Mode reports valuable information about the signal strength, battery charging status, cellular state and encryption status.

The information is organized to display information relating to Analog Control Channels, Digital Control Channels, Analog Voice Channels, and Digital Voice channels. All the information provided in this display is in accordance with IS–136.

To activate the Field Test Display Mode you must be in NAM programming. Instructions for entering NAM programming are on the previous pages.

From the Main Menu use the scroll key to display the ”Field test” menu and press the [**Select**] softkey.

Use the Scroll key to select “Enable” and press the [**OK**] softkey.

Turn the 8260 off then back on. The FIELD TEST display will begin automatically after wake–up as long as the user does not enter any characters into the display.

Scroll through the 7 different displays using the scroll key. Note that the automatic scroll feature for the Short Code Memory is disabled.

To disable the FIELD TEST mode. Return to NAM programming and disable the function under the FIELD TEST menu. Or, select MENU 10 and enter [00] in the field and press [OK].

Programming PSIDS and RSIDS:

The Nokia 8260 provides the option to program Private (PSIDs) and Residential (RSIDs) System ID’s as prescribed by IS–136. The PSID / RSID list is programmed to support system selection / re–selection processes, and SID display functions.

The Nokia 8260 product will support up to 5 different Private or Residential Systems in NAM 1. Using the NAM programming menu to program the PSID / RSID is just one of several ways that this information can be programmed. The phone also supports automatic programming of the PSID / RSID values via registration accept message from a Public & Private system, manually prompting with System Scan sub–menu option “**New Search**”, or via Over the Air Programming. Follow these instructions to program the PSID / RSID lists.

1. Enter the NAM programming menu and select NAM 1 (or the desired NAM). (Note: PSID / RSID is currently only available in the NAM 1 location. PSID / RSID locations for NAM 2 and 3 are reserved for future use.)

2. Use the scroll key to display “PSID / RSID LISTS” then press [Select].

3. Use the scroll key to select the PSID / RSID 1 or the desired PSID / RSID (1 through 5). Press the [Select] softkey.

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4. Each list contains:

System type: Select Private or Residential system type.

PSID / RSID: System ID of the Private or Residential system. Indicates which PSID / RSID the mobile will respond to.

Connected system ID: Connected System ID. The SID that the PSID / RSID is connected to.

Alpha tag: The name of the Private or Residential SID that will be displayed when the phone uses the PSID / RSID. The micro system can over–write the alpha tag once the phone is using the system with its network broadcast name.

Operator code (SOC): (SOC) This is the System Operator Code.

US		
AWS	=	2049,
Canada		
Rogers Cantel Inc.	=	2050,
Bell South Cellular	=	003,
Southwestern Bell Mobile Systems	=	004,
Vanguard	=	007,
Century Cellunet	=	008,
Pacific Telecom Cellular	=	009,
Midwest Wireless Communications	=	010.

These (inter)national SOC values are only an approximation from available information. Please call Customer Service (888–Nokia–2U) with corrections.

Country code: Enter the Country Code of the PSID / RSID.

Public service profiles: Contains up to 4 channel and color code values for each private or residential system. This information is necessary to initiate scanning for the Private or Residential System.

Private operating frequencies: Enter the channel number(s) of the private system. The parameters allow for up to 4 channels per PSID / RSID.

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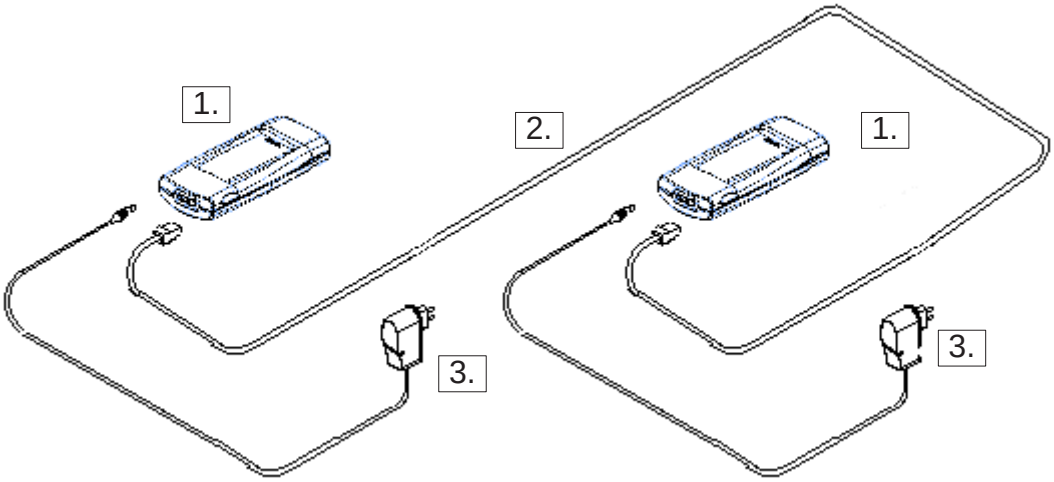
Warranty transfer

Warranty Transfer service concept



Item:	Service accessory:	Type	Product code:
1	Service Adapter (2 pcs)	FLA–12	0080389
2	Service Cable	SCH–6A	0730167
3	Travel Charger	ACP-8U	0675196

The Service cable SCH–6A and 2 pcs Flash adapters FLA–12 are used to connect two phones and transfer the warranty data (user settings and serial numbers) from one phone to another. The warranty transfer procedure is described below:

Point of Sale

– Phone 1 is broken and Phone 2 is the swap phone.

– Number the phones 1 and 2 to avoid mix–up.

– Plug the service cable SCH–6A between the flash adapters and connect the adapters to the phones 1 and 2. (in place of the phone battery)

– Turn the phone 2 on and then on Silent Profile

– Start the warranty data transfer by selecting code ***#92772689#** in phone 2.

– Select option **”Transfer user data?”** and press OK, ”Confirm transfer?” Press OK.

– Wait until the transfer is completed.

– Turn Phone 2 off, then back on and check welcome note and profile.

– After the transfer check with WinTesla the original and warranty ESN of the phone 2.

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– Send the broken phone no.1 to the central service.

Service Center

– Check and repair the phone .

– Change Warranty State from ”defective” to ”exchange”.

– Win Tesla and PKD–1CS are needed

– Menu: Software –> Warranty Info –> Info State –> select ”Exchange”

– Send the repaired phone to the dealer.

Point of Sale

– Use the returned phone as a swap phone.

– When the Warranty Info is transferred into a swap phone the Warranty State changes to USE mode.

– Send the broken phone to the central service.

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